

Shorelines 2000

Spring

On Shore

This Issue

Southern Lake Michigan Forum . . .	2
Indiana Boating Laws	2-3
Yellow Perch Tagging Project	3
A Threatened Symbiosis	3-4
Idle Speed Zone	4-5
Millennia before the year 2000 . .	5-7



Southern Lake Michigan Fisheries Forum

By Randy Lang

If you were fishing for answers to questions on southern Lake Michigan fisheries, those questions were probably answered at the April 8 conference held at Purdue University-Calumet in Hammond. The Illinois DNR, Indiana DNR Division of Fish and Wildlife, and the Illinois-Indiana Sea Grant program sponsored this one-day informational meeting. The purpose of the meeting was to provide a venue for research presentation and dialogue between anglers, charter captains, other commercial entities, biologists, and resource managers regarding the southern Lake Michigan fishery.

Invited speakers from the Great Lakes Environmental Laboratory (GLERL) and the US Geological Survey discussed the importance of primary food production in Lake Michigan. Researchers explained how changes in primary food production in Lake Michigan have altered the type and abundance of food available throughout the food chain. The dominant native zooplankton have been replaced with exotic species that feed upon and out-compete native species. Non-native alewives suppress native fishes by competing for zooplankton food and by preying on their young, but abrupt decreases in alewife abundance create problems for the predatory trout and salmon that keep alewives in check. Researchers explained how these changes affect the abundance of forage fishes in Lake Michigan. In recent years, native bloater chubs and smelt, deep-water forage fish, have decreased while alewives have been relatively stable.

Fisheries biologists from Illinois and Indiana discussed the status of sport-fish populations in southern Lake Michigan, and an overview was provided on the lakewide reduction in chinook salmon stocking. The chinook reduction is in response to declines in chinook health and disease outbreaks during years of low alewife abundance, their primary food source. Alewife populations often fluctuate rapidly, but salmon populations take three or more years to respond to stocking changes. The 27% reduction was initiated in 1999, after consensus was reached among scientists and public user-groups that stocking levels were higher than the food base would support during years of low alewife abundance.

Indiana biologists provided an update on the 1999 sport harvest and fish health issues. Additional topics included information on exotic species and an overview of on going and upcoming fisheries research projects.

"We were extremely pleased with the quality of the presentations that covered a wide range of topics," said John Kubisiak, Indiana's Division of Fish and Wildlife Lake Michigan Biologist. He added, "This was a comprehensive look at the past, and view of the future, that we hope will help anglers, the charter industry, commercial fishermen, and others to understand and appreciate the importance of cooperative and joint resource management on Lake Michigan."

The forum concluded with a review of emerging topics and a question-answer session. The weather that day was as unpredictable as Lake Michigan's fishery resource. Poor weather conditions, including strong winds from the north, created snow squalls throughout much of the day. Those attending the meeting, however, spent a comfortable day indoors learning about projects, programs, and issues influencing the fishery resource in southern Lake Michigan.

The New Indiana Boating Laws

The most recent session of the Indiana General Assembly made several changes to Indiana boating laws, which become effective July 1, 2000.

According to Indiana State Boating Law Administrator, Sam Purvis, "the first is a change in the carriage requirements for personal flotation devices (PFDs) or better known as life jackets on inland waters. The old law was any US Coast Guard approved PFD was sufficient for boating. The new law requires a wearable type PFD. And, on boats over 16 feet long, a throwable has to be carried, too."



Another change was made to the speed limit near the shoreline of a lake. This change applies to Indiana's inland lakes and to Lake Michigan. Formerly, the speed limit within 200 feet of shore was ten miles per hour. With the change, the speed limit is reduced to "idle speed." Idle speed is defined both by Indiana statute and rule to mean "the slowest possible speed, not exceeding five (5) miles per hour that maintains steerage so that the wake or wash created by the watercraft is minimal."

A third change expands the reasons for which rules can be adopted by the Natural Resources Commission to place restrictions on boating activities within particular geographic areas or zones. Examples include idle speed zones, no-ski zones, and no-boat zones. The "idle speed zone" for the channel that harbors the Blue Chip Gaming Boat, discussed elsewhere in this issue, is an example of a restricted zone within the Lake Michigan Coastal Area. Formerly, rules could be adopted only where a safety hazard would exist in the absence of a special zone. With the statutory amendments, rules can also be adopted to support "[f]ish, wildlife, or botanical resource management" or otherwise for the "protection of users."

These and other state statutes that govern boating operations on Lake Michigan are available online at "Boating on the Indiana Waters of Lake Michigan" at <http://www.ai.org/dnr/boating/>. This site also includes useful information for the Lake Michigan boater.

Update on Lake Michigan Yellow Perch tagging project

Approximately 52,500 yellow perch were tagged during spawning (April - June) at ten locations around Lake Michigan, including Green Bay, during the past three years. Tagged yellow perch have been recaptured by sport and commercial anglers and state agencies either shortly after tagging or up to two years after tagging. Approximately 5% of the tagged yellow perch have been recaptured, and the following conclusions are drawn from information on the recapture date and location of those yellow perch.

Male yellow perch were concentrated in near-shore areas during spawning and most male yellow perch

tended to remain near the tagging site until late-July. However, some yellow perch were recovered less than 100 km (60 mi) from the tagging site after a relatively short time at liberty (Table 1). In August through October, most yellow perch tagged near Milwaukee Harbor were recaptured south of the tagging site (e.g., Oak Creek, WI and Racine, WI).

Data from yellow perch that were tagged during the spawning season and then recaptured during the following spawning season imply that yellow perch do exhibit a tendency to home to spawning sites. The greatest proportion of recaptures of yellow perch tagged near Milwaukee Harbor occurred at the Milwaukee site. However, it is difficult to determine whether yellow perch are returning to specific sites to spawn or if the restricted home range of yellow perch impedes their movement to other spawning sites in subsequent years.

Compared to the large size of Lake Michigan, the home range of yellow perch is relatively small. Data from yellow perch tagged in Illinois in 1996 and recaptured in 1996-1999 imply that seasonal migrations do occur, but yellow perch from different areas of the lake do not completely mix during the year and long-distance movements are a rare occurrence. Regardless of the time of year that yellow perch were recaptured, at least 86% of the tagged yellow perch were found within 60 km (38 miles) of the site at which they were tagged; 93% were recaptured within 100 km.

A Threatened Symbiosis

A large colony of wild lupine (*Lupinus perennis*) in bloom is an impressive and sweet smelling symphony. Lupines' unique palmate divided leaves with flowers arranged on upright spikes vary in color from deep blue shades to purple. Found in sunny areas of bare sand, lupines thrive in black oak sand savannas and were very common prior to fire control.

Historically, wildfire swept the region on a regular basis, set by lightning strikes or by Native Americans who used fire to manage their ecosystem. Fire kills back the young growth of many woody plants, creating a landscape



of scattered, fire-resistant old oaks, surrounded by a rich mix of dry prairie grasses and flowers. Lupine and its savanna habitat are fire dependent. Today homes, livestock pens, and brush are invading the lupine stronghold.



Being a leguminous crop, the lupine, like other members of the pea family such as alfalfa and soybeans, assimilates the free nitrogen of the air, greatly enriching the soil. Lupine roots contain nodules of nitrogen fixing bacteria, enabling it to thrive in otherwise nutrient poor bare sand. In earlier days, people observed lupines' tendency to colonize sterile areas and mistakenly concluded that these wildflowers had caused the nutrient depletion by "wolfing" all of the nutrients from the soil—hence the name lupine, a derivative of "lupus" which is Latin for "wolf."

Aside from its beauty, lupines provide an important floral resource for native bumblebees, solitary bees, and are a host plant for several rare and endangered butterflies, including the Karner Blue butterfly (*Lycaeides melissa samuelis*). The Karner blue is a federally listed endangered species that depends on the lupine as its sole larval food source. Females lay their eggs on lupine leaves and blossoms, which become food for the larvae. As the caterpillars feed a species of ant commonly tend them. It appears



the ants protect the caterpillars from some natural enemies and, in return, the ants collect nitrogen-rich nectar exuded by the caterpillar. Research has shown that larval survival is greatly increased in the presence of these tending ants.

By the time the butterflies are ready to lay eggs, many of the lupine plants have died back and eggs are laid on old lupine stems, on plant litter, and on grass blades near wild lupine. Eggs laid in late summer over winter and do not hatch until the following spring. The winter snows protect the eggs from freezing temperatures and dehydration. The range of Karner blues only overlaps with the range of wild lupine where there are long periods of winter snow pack. Wild lupine is found in far more areas than Karner blues; its range extends across the Great Lakes states and down the East Coast to Florida. Because the larvae depend exclusively on lupines for food, the diminishing abundance of wild lupine has contributed directly to the local extinction of Karner blue populations across its range.



The open, oak savanna ecosystem that the Karner blues inhabit is among the most endangered habitat types on the planet; it is estimated that 99.98% of the thirty million acres of oak savanna that once existed in the Midwest is no longer oak savanna today, or is significantly degraded. Today, you can observe lupine and Karner populations in the extensive sand dunes of Lake Michigan and along power lines or trails where occasional mechanical disturbance maintains open microsites in fire-suppressed landscapes.

NRC modifies no-boat zone on channel holding Blue Chip gaming boat to become idle speed zone

During a regular monthly meeting held March 14, 2000, the Indiana Natural Resources Commission voted to modify a "no-boat zone" on the channel holding the Blue Chip gaming boat to become an "idle speed zone." The channel is connected to Trail Creek in Michigan City. "Idle speed" is defined by Indiana statute as "the slowest possible speed, not exceeding five



The no-boat zone was previously set by the Commission as a temporary rule and would expire this year unless extended. Last summer, the Commission voted to give preliminary adoption to amendments to make the rule permanent and directed a public hearing on the proposal be held in Michigan City.

Lt. Ed Troche, District 10 of the Indiana DNR's Division of Law Enforcement, said conservation officers had not experienced serious boating safety problems on-site. He said small craft operating in the narrow channel at high rates of speed could, however, pose a hazard. Troche suggested the concern be addressed by setting an idle speed zone rather than a no-boat zone. Those in attendance expressed support for the suggestion, and the hearing officer recommended an idle speed zone to the Commission.

General and signed by the Governor. With approval of the rule, the channel is eligible on May 14 for posting as an idle speed zone. The zone only becomes legally effective, however, when its mouth on Trail Creek is posted with signage consistent with US Coast Guard regulations.

By Jennifer Kane

—William J. Wayne, “Ice and Land,” in
Natural Features of Indiana (1967)

Lake Michigan, formed from meltwater of the Wisconsin ice sheet, is a unique feature very different from the rest of Indiana's natural features and



prey, alewife, and zebra mussel. Coho salmon, carp, and rainbow smelt have been added recently (in terms of geological time) to replace some of the species that have disappeared.

Valparaiso Moraine Section

The glaciers left 14,000 years ago and never returned to cover the Valparaiso Moraine, depositing the raw materials for the developing soils. The glacier retreated in stages, and at each stage a large lake of melted water was left in the basin between the Valparaiso Moraine and the retreating icecap. The Valparaiso Moraine soils, with its high ridges and kettlehole lakes and marshes, supported mesic forests of American beech, sugar maple, tuliptree, and red oak, and undergrowth of wildflowers. The long strips of land lying in the shallow valleys between the high ridges tended to collect water, forming ponds, marshes, swamps, and languid rivers. A variety of wetlands formed ranging from shrub swamps of buttonbush, to kettle lakes with floating mats of yellow spatterdock, white water lilies, and water shield, to fens and bogs. Bog waters are cold, extremely acid, nutrient poor, and very low in oxygen. Over time, sundews have adapted to the severe bog conditions and have developed the ability to capture insects to provide themselves with nitrogen and other essential nutrients. An excellent example of bog habitat is the Pinhook Bog within Indiana National Lakeshore.

Between 12,000 and 11,000 years ago, while glacial ice still covered portions of Lower Michigan, leopard and green frogs, american toads, and painted turtles were sharing southeastern Michigan habitats with mastodons, mammoths, and giant beavers. [Spruce woodlands gave way to pine forest, and then to deciduous hardwood forests and vast new areas of marsh and bog habitats became accessible.] 9,500 years before present, the Great Lakes region was ice free, but it took several thousand more years for the climate, the vegetation, and the herpetofauna to take on a modern aspect.¹ Species of frog, turtle (Blanding's and spotted), salamander (red-backed, tiger, spotted, and Tremblay's), snake (eastern massasauga rattlesnake) are remnants of the natural heritage of the region.

The western portion of Valparaiso Moraine was (and is) characterized by mostly knob-and-ket-

tle topography in the east that grades into a gently rolling till plain in the west. The eastern portion formerly was predominantly forested, while much of the western area was prairie. Prairies and savannas, with community characteristics of the Grand Prairie Natural Region, existed as small islands within the larger forest ecosystem. Some of these true tallgrass prairies characterized by big bluestem, Indian grass, compass plant, prairie dock, leadplant, and purple prairie clover covered hundreds, if not thousands, of acres. Bur oak and black oak savannas existed, but now are gone completely as are the areas of prairie except for a few small remnants in pioneer cemeteries and railroad right-of-ways.² Today Hoosier Prairie protects a high quality remnant of prairie landscape near Griffith.

Wild rice, berries, and nuts attracted birds to the marshes, as well as fur bearing mammals, such as the common muskrat, mink, beaver, and other small wetland mammals. Squirrel, wild turkey, partridge, deer, quail, buffalo and elk abounded in the timber tracts and prairies.

Chicago Lake Plain Section

The ridge-and-swale and lacustrine plain topography that occurs between the Valparaiso Moraine and the Lake Michigan Border identify the Chicago Lake Plain. It is located on the former site of Lake Chicago. The wave action of successively lower lake levels resulted in the low ridges of today. The topography of alternating east-to-west wetlands and uplands originally consisted of more than 100 ridges. Major natural communities of this section included marsh, lake, sand savanna, sand prairie, and swamp, along with minor areas of forest habitat. The most widespread community within the dune complex was the savanna. Sand prairie and sand savanna occurred on the tops and sides of sandy ridges. Sand prairie included little bluestem, Junegrass, sand reed grass, butterfly weed, wild strawberry, prickly pear cactus, among other species. Typical species of sand savanna included many of the sand prairie species, but also included goat's-rue, lupine, and sedges, black oak, and jack pine.

Wildlife characteristic of the Grand Prairie inhabited the Chicago Lake Plain along with species that thrived in sandy habitat, including the ornate box turtle, bull snake, glass lizard, plains pocket gopher, and lark sparrow.



Lake Michigan Border Section

The three major natural features distinguishing the Lake Michigan Border Section are the beach community, the high dunes, and the pannes. All occur in the immediate vicinity and influence of Lake Michigan. The beach community occupies a narrow strip of sand between the edge of Lake Michigan and the first line of dunes. It is an area where the sands are always shifting and assaulted by winter storms presenting harsh conditions for plant and animal life. Characteristic pioneer species included sea rocket, beachgrass, bug-seed, spurge, and silverweed. The beaches in pre-settlement times ran the entire length of Lake County's border with Lake Michigan, interrupted occasionally by creeks and streams. The beach area is a transitional ecotone where ant lions, nematodes, and single cell organisms still inhabit.

The beach community grades into the fore-dune of the high dune complex. The foredune community occupies the windward exposure of the first line of dunes, but over time has become more stable than the beach because of the presence of deep-rooted grasses such as little bluestem, beach grass, and longleaf reedgrass. Other species in existence were red-osier dogwood, beach pea, aromatic sumac, Pitcher's thistle and prostrate juniper. A scattering of jack pine and white pine are remnants of a cooler climate. The habitat on the lee side of high dunes supports a moderately moist forest and savanna including white pine, red oak, white oak, and black oak. Voles, shrews, woodpeckers, migratory birds, among others have inhabited the dunal complex for thousands of years.

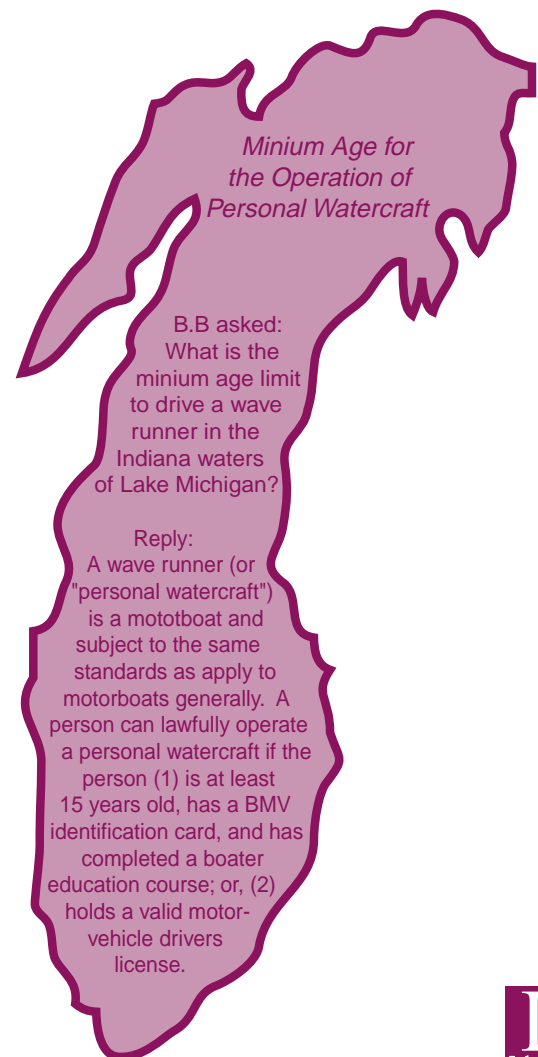
The dunes become generally larger from west to east. Scattered among the dunes are pannes, interdunal wind scoured depressions. Pannes typically retain water all year round creating a fen-like environ containing Kalm's lobelia, fringed gentian, rose gentian, stiff aster, and bladderworts. The fact that pannes include a rich assortment of rare native species, as well as a few found in no other community in Indiana, testifies to their pre-settlement origin.³

Between the Calumet Beach Ridge (a narrow area just south of the west arm of the Little Calumet River) and the dunes, a vast wetland referred to as the Great Marsh existed. Wetlands dotted other areas of the dunes and further inland; however, none were as continuous. From Michigan

City west through the Indiana Dunes National Lakeshore lay the Great Marsh, the wetland narrowed to approximately one-quarter mile. The enormous wetland complex evolved as back-waters of Dunes Creek and the Calumet Rivers, and as lagoons that were left standing after Lake Michigan finally retreated to its present lake level.⁴ Game animals, such as bear, bison, and elk to beaver, muskrats, and squirrels ranged the Great Marsh, along with upland game birds and innumerable migrating waterfowl.

The Northwestern Morainial Region contains the most diverse expression of the post-glacial process. The natural communities, each blending into the other, evolved as the climates warmed and cooled, to today's immense diversity.

Have Questions ?





The Lake Michigan Coastal Coordination Program is an effort by the State of Indiana to improve communications and cooperation among the agencies who participate in activities in the Lake Michigan coastal region.

See <http://www.dnr.state.in.us/lakemich/index.htm>

Managing Editor

Jennifer Kane

Editors

Laurie Rounds
Stephen Lucas

Graphics
Designer

Jeffrey S. Foreman

Indiana Shorelines for Coastal Coordination is a quarterly publication of the Lake Michigan Coastal Coordination Program.

Please direct questions, comments, or up-coming event information to:

Jennifer Kane, (317) 232-0156;
Coastal@dnr.state.in.us